Space Weather Forecast

Issued on Wednesday, 13 July 2022 at 01:02 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: R1-R2 blackouts likely, slight chance of R3 blackouts. G1/Minor Storms likely, slight chance of G2/Moderate Storms Day 1 (13 July). Slight chance of S1 throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low with only Common-class flares in the last 24 hours. The largest and also most recent one was a C7 observed at 12/1354 UTC. There are five sunspot regions on the visible disc. The region in the southern central disc remains the largest and most complex one, magnetically speaking, however it is mostly inactive. Another large region is now transiting across the northwest quadrant, it is currently stable while showing signs of further development. The region in the southeast quadrant is not as active as it once was but remains magnetically complex and likely to flare up. The most recent region, in the northeast quadrant, has some potential and is also showing signs of development. Finally the last region is an unremarkable and simple unipolar group.

There are numerous large filaments on the Sun. There were no signs of instability in these in the reporting period, however they will need to be monitored for any lift-off, particularly as some of them are now transiting across the western hemisphere. No Earth-directed Coronal Mass Ejections (CME) were observed in available imagery in the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind became enhanced in the last 24 hours, most likely under the influence of the high speed stream originating from a coronal hole. The solar wind speed was at slow-ambient levels and mostly around 330 km/s initially but started to increase from 12/0530 UTC, reaching 530 km/s by the end of the period. The magnetic field strength carried by the solar wind was moderate but became mostly weak over time, with the important north-south component showing important fluctuations between 12/0500-1200 UTC. The result of these solar wind measurements was a mostly Unsettled to Active geomagnetic activity, with a G1 / Minor Storm interval between 12/1200-1500 UTC.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be Low to Moderate, with a slight chance of strong (X-class) flares.

Solar Wind / Geomagnetic Activity: The solar wind is expected to be mostly elevated on days 1 and 2, under the influence of the HSS originating from CH99/+. However it may be superseded by the arrival of a CME that left the sun on 09 July, perhaps increasing the solar wind to strong levels. This CME is expected to arrive early on day 1 (13th), with confidence and effects decreasing rapidly over time. Otherwise, solar winds are expected to ease on days 3 and 4. Overall geomagnetic activity is expected to be Unsettled to Active, with a Chance of G1/Minor

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Storms and a slight chance of G2/Moderate Storms under CME effects. Geomagnetic activity then returning to mostly Quiet levels on days 2-4 (14-15-16 July).

Energetic Particles / Solar Radiation: The high energy proton flux (greater than 10 MeV) is likely to remain at background levels. There is however a daily Slight Chance of S1 or greater, due to the presence of two relatively large sunspot regions transiting across the western hemisphere.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	50	1	1	1
Strong	G3	No	2	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	50	50	50	50
Very Active	R3 to R5 X	No	15	15	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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